18. Explain the traversal algorithms for trees.

19. Demonstrate an implementation of a priority queue using an unsorted list.

20. Explain the splay trees with python implementation.

APRIL/MAY 2025

23PCA21 — DATA STRUCTURES AND ALGORITHMS

Time : Three hours Maximum : 75 marks

SECTION A — (10 × 2 = 20 marks)

Answer ALL the questions.

1. What is a sequence?

2. What are the differences between arrays and lists?

3. What is the principle of operation count?

4. How the exponential function is used in algorithm analysis?

5. What are the methods supported by Dqueue?

6. What is a path in a tree?

7. What is associative array?

8. What is the advantage of randomization?

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9. Write a note on Merge sort.

10. Define Graphs.

SECTION B — (5 × 5 = 25 marks)

Answer ALL the questions.

11. (a) Illustrate the abstract and physical views of a list implemented using an array and demonstrate the methods in list class.

Or

(b) Describe how the data is organized in multi-dimensional array.

12. (a) Discuss about the cubic function in detail.

Or

(b) Explain about binary recursion.

13. (a) Devise an algorithm for Matching Delimiters using stack operations.

Or

(b) Discuss the doubly linked list representation.

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14. (a) Develop the algorithms to add and delete elements in a heap.

Or

(b) Explain the python code for concrete hash map class with separate chaining.

15. (a) Develop an algorithm for deleting an item from a binary search tree.

Or

(b) Explain the data structures used to represent a graph.

SECTION C — (3 × 10 = 30 marks)

Answer any THREE questions.

16. Explain the python module to implement the Matrix ADT using a 2-D array.

17. Explain the multiple recursion by solving a combinatorial puzzle by enumerating and testing all possible configurations.